On Growing *Utricularia* sect. *Orchidioides*

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Introduction

The species in the genus *Utricularia* are grouped into many seetions. The species in the section *Orchidioides* are very popular and sought after by growers because of their large orchid-like flowers, their (usually) large leaves that dwarf those of most other species, and their interesting habit of producing tubers. This section includes the species: *U. alpina*, *U. asplundii*, *U. jamesoniana*, *U. endresii*, *U. praetermissa*, *U. quelchii*, *U. campbelliana*, *U. unifolia*, and *U. buntingiana*. However, section *Orchidioides* species often carry such a stigma of being so difficult to grow and requiring such complicated techniques or challenging conditions that, despite the interest in the group, only *U. alpina* is commonly found in collections. In truth, anyone who is able to successfully grow highland *Nepenthes* or *Heliamphora* should be able to grow a number of the species in this section with little difficulty. In this article I will detail how I have grown and currently grow the species from this section in the hopes that my experiences will help to demystify these plants.

Growers and carnivorous plant articles often clump the species in section *Orchidioides* together with those in section *Iperua*, but they have different cultivation requirements. I currently grow various clones of all the section *Orchidioides* except the final two species listed above. I also grow the hybrids *U. quelchii* × *praetermissa* 'Jitka', *U. alpina* × *endresii* and *U. humboldtii* × *quelchii* (see Figures 1-2, Front Cover).

Pots

These plants must be grown in drained pots, as they require excellent drainage. Orchid baskets and water lily-style net pots are an excellent choice as they provide extra air circulation through the growing medium, but standard style pots work fine as well. My current set up is a Slack-potting (nested pot) method that seems to work well for all species, though one of my clones of *U. endresii* is behaving as if it might prefer somewhat different treatment. My Slack-potting uses a half-height net orchid basket nested in a standard pot. In time the plants will grow to fill almost any pot so any size will work. The smallest pot I recommend is 7-10cm. I have found that room for lateral spread is more important than depth for these plants, which is why I use half-height pots. Some people have mentioned to me that they believe these plant need to reach a critical size before they can flower. Usually, these growers say the plant must be large enough to fill a pot about 15cm in size. Personally, I have never found this to be true and have had plants bloom in 7cm pots.

Media

Often, the plants in section *Orchidioides* are mistakenly referred to as the "epiphytic" *Utricularia*. In truth the term "epiphyte" is inaccurate because most of the species from this section more often grow as terrestrials in habitat than on the relatively dry surface of trees, where the risk of desiccation is higher. That said, many of these plants do perform better when grown under conditions of lower moisture, which are most easily achieved by growing in a manner

Figure 1: *Utricularia asplundii*.

Figure 2: *Utricularia praetermissa*.

Figure 3: *Utricularia asplundii*, showing the coarse planting medium.

Figure 4: Left to right, *Utricularia quelchii*, *U.* 'Jitka', and *U. praetermissa* in cultivation.

appropriate for epiphytes. In my years of growing these plants my choice of medium has evolved to best accomplish this. Here I will detail that evolution and discuss the pros and cons of each stop along the way. Please note that the only species I grew when I started was *U. alpina*, which is certainly the most forgiving of the species. *Utricularia alpina* is a perfect benchmark because if you cannot get it to grow well then the odds are against your being able to grow any of the other species. Because of this I recommend *U. alpina* as a starter plant to anyone interested in beginning to grow the plants from this group. *Utricularia alpina* is common in cultivation, as *Orchidioides* species go, so it is easy to replace in the event of a loss.

My initial medium for this group was the one that is described in *The Savage Garden* (D'Amato 1998). I found that while this medium initially had acceptable drainage it would compact quickly and rapidly develop a sulfuric stench indicative of anacrobic bacterial growth. The compaction of this medium was a serious problem as compact media do not drain well and these plants are very picky about being kept too wet for long periods. Anecdotal evidence also suggests that the proliferation of anaerobic bacteria in the lower portions of the medium may also be detrimental. I suspect that this is due to the byproducts of their metabolism (i.e. hydrogen sulfide), which may be toxic although it is also possible that the anoxic conditions formed around the roots may be the cause. For these reasons I scrapped this medium and moved on.

I next tried my standard *Nepenthes* medium, basically a mix of orchid bark, long-fiber sphagnum, and small portions of perlite and fine grade horticultural charcoal. This mix drained more freely than the previous mix but I still found that it would compact over time as the sphagnum decomposed and the perlite and charcoal settled to the bottom of the pot. This eventually led to conditions detrimental to the plant. It was while I was using this medium that I acquired *U. asplundii*. My attempt to grow this plant in the *Nepenthes* medium resulted in my almost losing the plant and prompted the next stage in the evolution of my planting medium.

My third medium was a mix of 2 parts long-fiber sphagnum to one part fine orchid bark. Both *U. alpina* and *U. asplundii* grew well in this mix, which drained freely and never developed anaerobic conditions. However, in time the sphagnum would degrade leaving nothing but the orchid bark, which was not as amicable to further growth. During this time I acquired *U. praetermissa*, *U. endresii*, *U.* 'Jitka' and *U. quelchii*. These plants were given to me by a grower who used a 2:1 perlite:long-fiber sphagnum mix and after talking with him further about the medium I again made a medium switch.

The perlite:long-fiber sphagnum medium worked well for a long period. The medium drains well while holding a good supply of water. However, given the details of my watering and growing techniques this method still resulted in too much moisture, compaction of the long-fiber sphagnum, and the eventual formation of anaerobic conditions. For these reasons I chose to switch media again. However, I believe that this medium (as well as the next media I will discuss), would work fine if the plants were grown in hanging orchid baskets supplied by overhead watering/misting.

During this time I read references to cypress mulch and its alleged anti-microbial properties. I thought that this might help solve the problem of anaerobic bacterial conditions that formed in the media but I was hesitant to incorporate a totally new, unknown factor into my media. However, I had previous experience with pine bark mulch (the brand I use is Nature's Helper® Soil Conditioner but any brand should work fine) and on a whim I decided to try it and see. I washed the pine bark mulch until all the fines (tiny particles) had been rinsed away. I used washed pine bark mulch to fill half the pot and then filled the remainder of the pot with an equal part mix of perlite, pine bark chips and long-fiber sphagnum, finally I topped that with a few sprigs of live sphagnum. This combination proved very successful for most of the species, the exceptions being *U. endresii* and, I learned later, *U. quelchii*. All the plants (except *U. endresii*) grew strongly in these media and I was able to divide each annually.

It was during my most recent annual division process that I noticed something that led me to my current (but, for some reason I doubt final) method. What I noticed was that, while all the species had extremely dense stolon growth, only *U. alpina* had put stolons down deeper than a centimeter or so. Any adventurous stolon growth from species other than *U. alpina* was strictly

horizontal, involving stolons growing out and over the edge of the pot. I also noticed that the stolons of all species were most dense in the patches of live sphagnum.

In the past I had often heard of other growers using long-fiber New Zealand or Chilean sphagnum. In fact when I was first looking into growing section *Orchidioides* species these were the media most often recommended. I had no success with these media (the first *U. alpina* I attempted to grow, I placed in this kind of sphagnum and lost it before it even recovered from shipping shock) so I had written off straight sphagnum of any form from the very beginning. The dense growth around the live sphagnum made me rethink this idea.

Obviously there is a difference between long-fiber dead sphagnum and live sphagnum. In my experience, no matter what measures are taken, long-fiber sphagnum will always compact over time while live sphagnum tends to remain loose and non-compact. This somewhat minor-seeming difference in character makes for a major difference in terms of use as a medium. My current medium is live sphagnum. I grow my plants using a rather complicated Slack-potting method. Setting up the system entails putting a half-height net orchid basket in a standard pot and threading some strands of sphagnum out the bottom of the basket, to hang down into the bottom of the outer pot (see Figures 3, 4). To pot the plant I fill the half-height net pot with live sphagnum and settle the plant among the sphagnum, usually by teasing the moss over the stolons. This may seem an extravagant method but it is what works for me. I am reasonably sure that a pot filled half way with something well draining (perlite, pumice, coarse orchid bark) and topped with live sphagnum would work just fine. Using live sphagnum in this manner results in a micro-environ that has the perfect balance of moisture and aeration (see Figure 5). The only plant I do not grow in live sphagnum is *U. jamesoniana*, which I grow in either straight pine bark mulch (which is not washed, so that it retains the fines) or peat:sand either in my Slack-potting style or in standard pots. From reports I also suspect that *U. campbelliana* might grow well in these same media but I do not yet have first hand experience with this species.

Watering and Humidity

These plants are best treated along lines similar to *Nepenthes*, i.e. watering to keep the media damp but not soaking wet. However, these plants have no set watering requirements and often what works well for one may not apply to others. I find that *U. alpina* is the most tolerant of excess moisture, and often grows well under conditions that would cause the loss of other plants from section *Orchidioides*. Likewise, *U. jamesoniana* is more tolerant of wet conditions and can even be grown on the tray system along the lines of a terrestrial *Utricularia*. With my Slack-potting method I simply place the whole set-up on the tray system with water 1-2cm deep and then top water whenever the tray dries. Plants grown in hanging baskets or the like can simply be top-watered frequently enough to keep the sphagnum happy and growing.

Figure 5: *Utricularia asplundii* in a nested pot.

If using any of the other potting methods/media the watering method I found that worked well was to use small Styrofoam blocks (2-3cm tall) under the pots. By setting the pot on blocks the excess water drains away so that the pot is not sitting in it but its presence in the tray creates a higher local

humidity in the range of 50-90%, most often about 70%. The pots are kept on this modified tray system and are top-watered when the long-fiber sphagnum starts to get a little dry. Using this method I will occasionally observe stolons growing out the bottom of pots and into the tray. While this might seem to contradict my statement that these plants prefer drier conditions I will note that these stolons never develop leaves and tend not to travel much more than a few centimeters from the point where they exited the pot. In time they rot away.

These plants can be conditioned to somewhat lower humidity levels, like those of a windowsill, but this should be done slowly as the leaves of many are thin and can dry out rapidly.

Light and Temperature

Previously I grew all of these species under four 120cm fluorescent tubes. To provide a broad spectrum I used 2 Sunshine bulbs, 1 warm white bulb, and 1 cool white bulb. The lights were hung so that they were 30-45cm above the pots. The few plants that I have grown outdoors I place in areas that receive dappled sunlight throughout the day; I do not allow the plants to receive full direct sun.

I have recently switched to a 400W MH/HID system on a track. Initially I had situated the plants about 90cm below the light but after observing their growth I have changed this distance to 65cm.

While these species are native to South and Central America most occur in highland areas and grow best under intermediate/highland tropical conditions. In my collection they do best when grown under the cooler conditions of my high elevation growing area located in my crawlspace. Day temperatures tend to be between 18-23°C (64-73°F), with night temperatures dropping down to 15°C (59°F) during the summer months. Winter temperatures are about 5-7°C (9-13°F) degrees lower. I have successfully adapted a clone of *U. alpina* to outdoor conditions here in Atlanta from spring through fall so it is possible to grow some of these plants under warmer conditions. Discussions with other growers have led me to believe that some of these species may be able to handle temperatures up to approximately 38°C (100°F) but only for very short periods, and the humidity must be very high during such times. Extended periods at temperatures above 33°C (91°F) often lead to the plant dropping their leaves and dying back. In some species this can lead to the death of the plant although some, such as *U. alpina* (and purportedly *U. endresii*), may come back from their tubers once temperatures drop to a reasonable level.

There are also some species that have ranges down to sea level. If you have a clone that is known to be from such a locale it might survive well under higher temperature conditions but I would not recommend experimenting on an unknown clone unless you have a duplicate specimen.

Dormancy

In my experience almost all of the forms of the *Orchidioides* species I grow exhibit some form of seasonal slowing or cessation of growth. I call this a pseudo-dormancy because the plants are not actually in a dormant state. Instead they are usually still actively growing stolons underground, and have only ceased or drastically slowed their above-ground leaf production. During this the medium should be kept only damp and it is better to err on the side of too dry than too wet. Humidity during pseudo-dormancy should be high enough to prevent desiccation of the stolons and tubers. *Utricularia endresii* is reported to have a true dormancy period where it sheds all of its leaves and dies back to the tubers and stolons, during which the plant should be kept on the dry side (Belanger 1995). For the first time this past winter I observed one of my *U. endresii* clones lose its foliage this way (I have 3 different clones). I raised the nested pot out of the water, placed it on an inverted pot, and let it dry completely for about three months. Then I lowered it back into the water and within a week I saw new growth. More recently I have noticed a die-back of foliage on one of my *U. praetermissa* clones that looks very similar to what the *U. endresii* did. I have raised this pot out of the water and will see what it does over time.

These plants are propagated most easily via division. A clump is best taken from the mother plant during active growth and potted up in new media. While it is possible to make a successful division from nothing more than a single tuber I find that the best minimum to take is a complete peduncle base with a full tuber cluster and at least one leaf. Ensure you keep the humidity high and the media only moist for the division and the parent plant. This procedure may result in the division (and in some cases the parent) losing many or all of its leaves. Continue to treat the pot as if the plant were in pseudo-dormancy (i.e. drier than if it were in active growth) because in many cases the plant is simply establishing its stolon system first.

Seed can also be used but it must be very fresh or it will likely not be viable. My best results have been with seed less than one month old though I have had germination, at decreasing rates, on seed up to six months old if it was stored in a refrigerator. Seed older than six months is almost worthless. Sow seed on finely milled sphagnum or a peat:sand medium and keep it moist and in high humidity. A very successful method that I employ is to sow the seed on the surface of the medium in a 5cm pot, lightly water it, and then place it immediately in a sealed plastic bag. The closed bag maintains high humidity and the small amount of water that drains through the pot and pools in the bottom of the bag acts as a permanent reservoir but does not make for an excessively wet condition. After 1-2 years the seedlings can be thinned out or transplanted.

Cross-pollination of different clones is recommended to achieve vigorous seedlings, and it appears that some plants may be self-infertile. Hybridization with some epiphytic species is possible (if you like that sort of thing), and can result in attractive and relatively easily grown plants such as the cultivar *Utricularia* 'Jitka' (Studnicka 2005, 2006). Hybridization experiments can also yield results of interesting scientific value, such as the recent discovery that *U. quelchii* from section *Orchidioides* can successfully hybridize with *U. humboldtii* from section *Iperua* (Studnicka 2006). A similar hybrid was made even earlier, when *U. humboldtii* was successfully crossed with *U. alpina* (T. Carow, pers. comm.). These observations made in cultivation preceded recent high-tech results (Müller & Borsch 2005) that indicate the two sections should be merged!

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